REMARKS

Claims 10, 11, 16-20 and 24-29 are now in this application.

By this amendment the language of former claims 12, 14 and 21 has been incorporated into claim 10. And accordingly, these claims, plus others which had similar language, have been canceled.

The remaining claims also have been revised so as to correct the language objected to by the examiner on pages 2 and 3 of the Office action.

In the Office action the examiner rejected claims 10-29 as anticipated by Kappel et al, DE 4306073, and additionally claims 10, 16, 17, 28 and 29 were further rejected as unpatentable over Kappel et al in view of Bart and Fuessner.

The essential distinction between the Kappel et al reference and the subject of the present invention is that in the present invention, according to former claim 12, the language of which has been incorporated into independent claim 10, the piezoelectric actuator is centered in an annular chamber 17. Furthermore, according to former claim 14, the language of which has also has been incorporated into claim 10, the inner chamber 31 communicates with the annular chamber 17, so that the annular chamber 17 and the inner chamber 31 are both subjected to fuel at injection pressure. As a result, the piezoelectric actuator and part of the booster piston 31 are surrounded by injection pressure. And still further, the language of former claim 21 has been added to independent claim 10, and by this addition claim 10 now also recites that communication between annular chamber 17 and control chamber 42 is achieved by means of a leakage gap between the booster piston and the nozzle body.

In the Kappel et al reference, the fuel supplied by means of KRZ is delivered at injection pressure only to the nozzle needle pressure chamber that surrounds the nozzle needle (see Kappel et al at column 4, lines 5 through 6).

In further distinction to the structure recited in claim 10, the chamber KA3 of Kappel et al is not filled via fuel supply KRZ, but rather chamber KA3 is filled by a separate hydraulic supply GB, and/or accumulator SP, see Kappel et al at figure 9. Chamber KA3 is thus not maintained at fuel injection pressure, nor is it supplied by fuel at injection pressure as is recited in claim 10.

And in even further distinction to the structure recited in claim 10, the chamber KA2 in Kappel et al, which corresponds to the inner chamber 31 in the present invention, is filled from the chamber KA3 via the conduit BH (see Kappel et al at claim 4). Consequently, the chamber KA2 is likewise not subjected to injection pressure. Thus in Kappel et al the piezoelectric actuator P and the chamber KA2 are not subjected to injection pressure. These chambers are supplied with hydraulic fluid via bore GB (see Kappel et al at column 4, line 63, through column 5, line 7).

Thus clearly the reference to Kappel et al does not teach, or make obvious the structure as now recited in present independent claim 10.

In the Office action the examiner added a rejection of claims 10, 16, 17, 28 and 29 as unpatentable over Kappel et al in view of Bart and Fuessner. But these additional references to Bart and Fuessner do not add any structure which, as pointed out above, is missing from the base reference to Kappel et al.

In particular, Bart, as recited by the examiner, teaches a compression spring concentrically surrounding a booster piston and braced by a collar of the booster piston. But this has nothing whatsoever to do with the structure which, as pointed out above, is lacking from the Kappel et al reference. In particular, this teaching of Bart does not supply any teaching of supplying the annular chamber, surrounding the piezoelectric actuator, with fuel from the fuel supply at the injection pressure. Nor does this reference teach that the inner chamber 31 communicates with the annular chamber. Accordingly there is no way that the reference to Bart can be considered to supply the teachings which are missing from the base reference to Kappel et al, and thus make for a proper rejection of the claims of this application.

Likewise, the reference to Fuessner does not teach anything which makes these distinguishing features of the claimed structure over Kappel et al obvious. In particular, while Fuessner might show the use of a union nut, this is not a teaching of supplying the annular chamber, which surrounds the piezoelectric actuator, with fuel at injection pressure, nor does Fuessner supply any teaching of an inner chamber, such as applicants chamber 31, nor of filling such inner chamber with fuel from the annular chamber.

In furtherance to the prosecution in this application, it is pointed out that in the parallel European prosecution, the reference JP 10 288 117 was cited as the closest prior art. This reference likewise discloses a directly triggered fuel injector with a piezoelectric actuator with a piston-in-piston system for stroke reversal. In this reference, the injection pressure is likewise introduced via the supply line 6 directly into the nozzle needle pressure chamber 3. However, in this reference, the annular chamber surrounding the piezoelectric actuator is disconnected from

the injection pressure by means of seals 12, which are disposed on the booster piston 11. Also in this reference, the chamber 30, which corresponds to the inner chamber 31 in the present invention, is connected via the conduit 19 to the nozzle needle pressure chamber 3 so that it is subjected to injection pressure. The present invention, in addition to distinguishing the Kappel et al reference, defines over the Japanese reference by the addition of the language of former claim 21 to present independent claim 10. By means of this addition, claim 10 makes clear, compared to the Japanese reference, that the control chamber 42 is filled from the annular chamber 17 via the leakage gap 43. In the Japanese reference, the filling of the control chamber 8 takes place via a leakage gap between the booster piston and the rear region 7 of the nozzle needle 2. Because of the seals 12, filling cannot be done from the annular chamber that surrounds the piezoelectric actuator.

For the above reasons it is believed that claim 10 patentably distinguishes from all of the cited prior art, and therefor entry of this amendment and allowance of the claims are courteously solicited.

Respectfully submitted,

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